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Remote measurement of ground source emissivity

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The remote measurement of the emissivity of ground materials is of tremendous value in their identification and mapping. Traditional techniques use reflected solar radiation for this measurement for wavelengths shorter than 5 μm. TAISIR, the Temperature and Imaging System InfraRed, exploits the 10 μm water window and cannot use standard techniques for source emissivity measurement. Previous work using the multi-angle data acquisition technique is extended to determine the specular and diffuse reflectivity of a ground source. The emissivity is one minus the sum of the reflectivities. Signal-to-noise requirements for use of the technique under ideal conditions, and limitations of the applicability of the technique are discussed. The model is compared to measurements from a low altitude platform.

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